

suggested why this stepping should be so marked a feature in iron, while it is so comparatively rare in certain other metals. This reason is that the ferrite crystals in ordinary iron and steel are formed by crystallisation from a solid solution, while the ordinary crystals of lead, for instance, are formed by crystallisation from a true liquid. The truly crystalline character of slip-bands is further demonstrated in a novel manner by the observation of slip-bands in iron following and revealing the gliding planes of twin crystals. Finally, the view has been advanced that the strength of inter-crystalline cohesion in pure metals and certain forms of alloys is due to the interlocking of the skeleton arms which the crystals develop during their first formation. According to this view, the inter-crystalline boundaries take the form of regions of mixed orientation, and certain consequences are to be deduced from this consideration. It is argued that, since a region of mixed orientation must offer greater resistance to slip than a region of uniform orientation, the inter-crystalline boundaries form a network of cells upon which the true resistance of the metal depends. Plastic deformation sets in when these cell-walls begin to give way; in doing so they carry with them the less resisting masses of the crystalline grains. In this way the observed relation between slip-bands and inter-crystalline boundaries is explained. Observations of a frequent doubling of the inter-crystalline boundaries between ferrite grains in pure iron and the "bordered boundaries" and "spines" in strained metal are adduced as further evidence in support of this view of the structure of inter-crystalline boundaries.

Mr. B. H. Thwaite (London) contributed a paper on the use of steel in American lofty-building construction. During the past five years some 200,000 tons of steel have been annually consumed in steel frame construction in the United States.

Mr. P. Breuil (Paris) submitted a report on the work carried out by him as a Carnegie research scholar. It dealt with the relations between the effects of stresses slowly applied and of stresses suddenly applied in the case of iron and steel. He showed that the tests made with nicked bars, a widely extending practice in France, were just like those made with plain bars, but much less clear and precise. The nicking of test bars simply introduces a further complication.

Mr. P. Longmuir (Sheffield) submitted a report on his research, as a Carnegie scholar, on the influence of varying casting temperature on the properties of steel and iron castings. With mild steels the influence of casting temperature does not appear to show on the tensile properties. Low casting temperatures, however, appear to induce a type of brittleness not evidenced in the tensile test, but shown in the working life of the metal. It is possible that many of the mysterious fractures of steel, which has previously passed a rigorous inspection, may be traced to the original ingot having been cast at too high or too low a temperature.

### THE SOUTH AFRICAN ASSOCIATION.

THE second annual meeting of the South African Association for the Advancement of Science was held at Johannesburg during the week commencing April 4. At the opening meeting Lord Milner presided, and Sir Charles Metcalfe delivered his presidential address, which, in addition to a review of the scientific advances during the preceding year, contained a number of comments on some of the causes which have effected the great advances in scientific knowledge in recent years.

Portions of the address appeared in the *Johannesburg Star*, and we have selected from them a few extracts of scientific interest. The only address which has reached us is one given by Mr. E. B. Sargent on "The Education of Examiners," and an abridgement of this will probably appear in our next number. For the subjoined abstracts of other addresses and papers we are indebted to the *Johannesburg Star*.

#### Presidential Address.

Referring to diseases of stock, Sir Charles Metcalfe said:—In Rhodesia, Dr. Koch has been spending the whole year in laborious and patient investigation of the African

coast fever among cattle, and he has now reported that he has found that it is caused by a blood parasite which can be readily identified by a demonstration of the specific organism, that it is different from Texas fever, or so-called red-water, that it is not transferable directly, that sick animals can be stabled with healthy ones without communicating the disease, and that the disease can only be spread by ticks. Further, that the blood of animals which have recovered and become immune is not free from parasites, and that the disease therefore can be produced in healthy animals by the transfer of parasites from salted animals by means of ticks, and though fencing, dipping and spraying are beneficial, yet as they have only a temporary value, Dr. Koch recommends that these precautions should be supplemented by inoculation with the blood of animals that have recovered whenever disease breaks out in the vicinity.

Turning to another subject, the president continued:—the geodetic survey of Africa, the inception and continuation of which owe so much to our past president, Sir David Gill, is being proceeded with both in the Transvaal and in northern Rhodesia beyond the Zambezi. It is intended to extend it northwards more or less, probably along the route of the Cape to Cairo railway, that projected line which to many appears, perhaps, to belong to the things of dream-land. You, however, who know South Africa well will agree with me that in this country it has generally been found that the sanguine man has ever been the truest prophet. When this geodetic survey has been connected up with that of Europe, which has now been extended as far north as Spitsbergen, we shall have an arc from that point to Cape Town—the longest arc that is possible to us on this globe. All civilised nations have found the advantage of having proper and accurate maps, and it is hoped that a useful work may now be undertaken in South Africa by a system of secondary triangulation. This work will necessarily take many years to complete; every year, however, the recorded results will be of value, as they will enable correct maps to be compiled showing the topography and main features of the country and the situation of the larger farms, of the most important and more populated districts in the first place, and then of the more remote parts of the country.

Introducing the subject of anthropological research, the president remarked that Prof. Haddon, when president of the Anthropological Institute, expressed himself strongly on the urgency of anthropological research. "In view," he said, "of the decrease of the native races by the advance of civilisation and the changes in the habits of the survivors, no time is to be lost in the acquisition of scientific knowledge by direct observations." There is wide scope and much opportunity in South Africa for such research, though Sir Charles Metcalfe said "the argument about their decrease and the use of the word 'survivors' read strangely to us, who see the native races not decreasing but happily increasing in numbers as well as in material prosperity."

Later in his address Sir Charles Metcalfe directed attention to the fact that for research into the causes and preventives of disease, both in human beings and in animals, there is a great field in South Africa. Continuing, he remarked, "The various Governments here have shown commendable vigour in dealing with those terrible scourges, rinderpest, plague, and red-water, and have acted in a spirit of the truest economy by securing the services of the most able men of science of the day in their investigation. When England was ravaged by rinderpest, no remedy was discovered; the animals affected were simply destroyed at a cost of some nine millions of money. It was left for South Africa, at a later date, when knowledge was more advanced by the admirable work of the scientific investigators engaged on that task, to be the first to discover a preventive for that disease, a fact of which this country may well be proud. I have mentioned Dr. Koch's great work in the investigation of cattle fever in Rhodesia. He has also at the same time undertaken researches into some others of the diseases affecting animals in South Africa, amongst them that most familiar but terrible disease which we call horse-sickness, a disease by which the country loses not only many thousands of pounds annually by the deaths of valuable animals, but also the large amount

that otherwise might be realised by the breeding of horses and mules. I understand that Dr. Koch is sanguine as to the result of his researches. Time alone will show whether his efforts or those of Dr. Edington and other labourers in this field have given us the much-to-be-wished-for certainty of rendering horses and mules immune from this disease. Work is being carried on in the investigation of the other manifold sicknesses to which animals are liable in South Africa, but 'science is slow,' and much more time and patient research are necessary before we can arrive at what we look forward to—a period when we shall no longer be helpless and at the mercy of these devastating pests."

*Papers read before Section A.*

The genesis of soils, with special reference to the Transvaal, by Mr. A. F. Crosse. The author pointed out that the bulk of the parent rocks are of small potential value as soil formers. Illustrative of these deductions, he instanced the well known poverty of granite soils, and in contrast gave as an example the fertile soils of the Marico and Rustenburg districts. In these districts, situated around the edge of the granite, are numerous intrusions of basic rock, of high agricultural potentialities—as a result, the soils formed therefrom are the richest in the country. Mr. Crosse is optimistic as regards the future of agriculture in the Transvaal. Given a fair proportion of the revenue obtained from the taxation of the industry devoted to the intelligent fostering of agriculture, he did not see why, with the aid of science, farming on a fairly large scale should not give a fair return to the agriculturist, and so maintain that most necessary class—the yeoman farmer.

The metallurgy of the Transvaal, by Mr. J. Williams, president of the section. The author said that the mining of gold, until very recently, had been conducted in a very primitive manner. The Plattner process, for a long time, was the only one which held the field, but it could only be used in conjunction with some method of concentration. It was, however, left to Mr. McArthur to show that cyanide could be used commercially for the extraction of gold. Mr. Williams then proceeded to give an outline of the modern process of extraction as used in the Transvaal.

Some practical observations on forestry, by Mr. D. S. Muldoon. The author gave a list of trees that grew well in the Transvaal, and were of high economic value. He also mentioned the advisability of planting trees along the railway lines; these trees would be of use in affording shelter to the locomotives, which could, therefore, maintain more steam, especially in high winds, and when the trees were full grown the railway would have its own supply of timber for sleepers, beams, &c. A knowledge of forestry should also be given in the State schools, and children encouraged to plant trees, shrubs, and plants around the waste places surrounding the school sites. The utility and value of trees indigenous to the country were also touched upon. The advisability of street tree-planting in the towns of the Transvaal was also pointed out, and the attention of the president was directed to the need for a Forestry Bill dealing with timber on Crown lands.

Duration and areas of heavy rainfalls, by Mr. D. C. Leitch. The author gave figures as found by observatories in England and America on the rates of rainfalls, quoted Prof. Talbot's formula, and gave some results obtained in the Transvaal. He quoted one instance where 4.86 inches of rain fell in one hour, whereas the heaviest rainfall in the British Isles does not exceed the rate of 1.8 inches per hour. The author mentioned that the recent Bloemfontein flood was said to be due to a rainfall of  $2\frac{1}{4}$  inches over 14 square miles of catchment area.

Mr. G. A. Denny read a paper on diamond drilling and prospecting by drilling.

The prehistoric monuments of Rhodesia, by Mr. E. P. Mennell. The author discussed the question as to the origin of the larger of the various ruins which occurred in Rhodesia, depicting the possibility of the structures having been erected by indigenous tribes.

Nature-study in South Africa, by Mr. Sclater. The author pointed out the weakness of the type system of the study of biology. The love of nature should be fostered by the teacher taking children into the field. For example, in the case of birds, the child should be taught to note the times of migration, and inquire to what extent migrating birds

nest in South Africa. They knew very little about the mammals of South Africa. They knew little about the life-history of frogs and toads. The habits of spiders opened up a large field for study. He urged that pupils should be encouraged to collect so as to form school museums.

The cyanide process from the standpoint of modern chemistry, by Dr. J. Moir. Dr. Moir described the solution, precipitation, &c., of gold on the line of the ionic theory, and showed that various reactions which had formerly been considered obscure could quite well be explained by it.

Some economic problems in metallurgy on the Witwatersrand, by Mr. Harry S. Denny. The author dealt with the salient features of metallurgical practice on the Witwatersrand from the point of preliminary breaking to the handling of slimes and sand residues.

The evolution of the treatment of by-products on the Witwatersrand, by Mr. M. Torrente. The author summarised the principal by-products produced in a mine as follows:—In connection with the battery: concentrates, black sands, sweepings, slags, pots, ashes, battery chips, and screenings. In connection with chlorination works: pots and ashes. In connection with cyanide works: concentrates, sands and slimes, slags, white slimes, Prussian blue, scrapings, sweepings, skimmings, dross, litharge, brick dust, test bottoms, sump sediments, ashes, crucibles and liners. The list is large, and if there is to be any profit, the cost of recovery must necessarily be less than 4/ a ton. Although, said the author, much has been attained, plenty of problems still await solution. On the Rand money is lavishly spent if there seems the remotest chance of effecting an improvement. The friendly rivalry, as well as the interchange of ideas and experiences, all help in the same way, and this is one of the most noticeable features of the scientific life of the Rand.

The chemical industry of the Transvaal: a forecast, by Mr. W. Cullen. The author remarked that on account of the gold industry being such a large factor in the prosperity of South Africa, they were sometimes inclined to overlook the possibilities of others. The chemical works and the dynamite industry managed to exist now with practically no protection, and this ought to make them look around. Proceeding, he outlined the existing chemical industries of the Transvaal—the total making a very poor show. He included the cement works at Pretoria, which, he said, was now manufacturing an article equal to European brands. Looking ahead, he asserted that the term metallurgy, as used in the Transvaal, would soon have a much wider meaning than at present, and would embrace that of zinc, lead, copper, and possibly tin and iron. Foremost among the chemical imports was that of cyanide, and he was optimistic about the possibility of manufacturing it in the Transvaal at a profit. The plague, and the greater attention being paid to matters sanitary, had created a steady demand for chloride of lime, all the raw materials for which were to be found in the country. There would soon be a great demand for artificial manures, and here again nearly everything was at hand. Among other possible industries, he mentioned that of candles and oil from the shale which was abundant, alkali from by-products, glass, soap, alcoholic fermentation and distillation, when potatoes and mealies became cheaper, &c.

The contact process of sulphuric acid manufacture, by Mr. E. Weiskopf. Results of some further observations upon the rate of evaporation, by Mr. J. R. Sutton.

*Papers read before Section B.*

Biological and ethnological observations on a trip to the north-east Kalahari, by Dr. Schonland.

The geological features of the diamond mines in the Pretoria district, by Mr. Herbert Kynaston, director of the Geological Survey, and Mr. A. L. Hall. The authors, after describing briefly the area and situation of the Transvaal diamond fields, proceeded to give an account of the general geological structure of the district in which they occurred. The diamond pipes contributed a group situated on the high ground forming the watershed between the Elands and Pienaars Rivers, about 22 miles east of Pretoria. They have been intruded into the uppermost beds of the Pretoria series—a formation consisting of quartzites, shales, and diabase sheets, lying between the dolomite and the Waterberg sandstones—and are found to be surrounded partly by

quartzite and partly by intrusive sheets of diabase and felsite. Their situation is, in the authors' opinion, associated with lines of weakness which have been set up by the movements and dislocations which have affected the Pretoria series in the diamond field area. In the case of the Premier Mine, the pipe is almost entirely surrounded by a felsitic rock, which is intimately associated in places with a diabase. This diabase and felsite, in fact, pass gradually the one into the other, and form the lower and upper portions respectively of a large intrusive spot. The walls of the Premier pipe at lower levels, however, appear to consist of the quartzite which underlies this sheet.

Alien plants spontaneous in the Transvaal, by Mr. Joseph Burtt-Davy. The author dealt with the question, Where do our immigrant plants come from? An analysis shows that the regions where the immigrants are native are approximately as follows:—the Mediterranean region (*i.e.* the countries of south Europe, west Asia, and North Africa, immediately bordering the Mediterranean Sea), approximately 42 per cent.; tropical Asia, approximately 10 per cent.; tropical Africa, approximately 9 per cent.; tropical America, approximately 18 per cent.; northern Europe, approximately 7 per cent.; South Africa, approximately 6 per cent.; temperate North America, approximately 3 per cent.; Australia, approximately 3 per cent.; temperate South America, approximately 2 per cent.; Central Asia, approximately 1 per cent. The means by which plants migrate from country to country were then considered. The author said these fall under two heads:—(a) artificial means or by the agency of man; (b) natural means. The former methods are responsible for far the largest part of modern plant migration. They include (1) dispersal of roots and seeds by farm machinery; (2) conveyance of seeds and bulbs in the earth around the roots of nursery stock; (3) conveyance of seeds in the packing material of warehouse and shop goods; (4) conveyance in hay and other forage; (5) conveyance in impure samples of farm and garden seeds; (6) intentional introduction as useful or ornamental plants, subsequently escaping the garden or farm and becoming naturalised; (7) conveyance from port to port in the ballast of sailing vessels; (8) conveyance in railway trucks, which drop seeds at stations along the road; (9) conveyance by trek oxen and waggons, which drop them along the roadside; (10) conveyance along the tow-path; (11) conveyance by irrigation water.

The natural means are as follow:—(12) spreading by runners as in the tweekgranesk; (13) spreading by underground rhizomes, as in Johnson grass or evergreen millet; (14) spreading by running roots, as in the Canada thistle; (15) special structures of the cupule, enabling it to throw seeds for long distances; (16) the provision of flying apparatus attached to seeds, so that they are carried by the wind—one of the most common methods; (17) drifting by the wind over snow or frozen ground; (18) tumbleweeds; (19) conveyance by floods and streams; (20) burr-weeds, &c., carried in the hair and wool of animals, one of the most common contrivances for distribution; (21) seeds and pieces of plants carried on the feet of water-birds and aquatic reptiles; (22) kraal weeds, the seeds of which pass through animals undigested; (23) spiny fruits and branches carried by animals.

Trout acclimatisation in South Africa, by Mr. B. Bennion. Trout acclimatisation was dealt with generally, and the history of trout acclimatisation in South Africa—in Natal, Cape Colony, and the Transvaal—was given very fully.

The science of bacteriology and its commercial aspects, by Mr. W. H. Jollyman. The object of this paper is largely to answer the question, What practical results accrue from the study of the science of bacteriology? The reply is divided into four sections, showing (1) the assistance the science renders to medicine in the matter of diagnosis of disease; (2) the improved treatment, and consequent lessened mortality resulting from a knowledge of the causal agents; (3) the public health and sanitary science aspects of the study; (4) the work bacteria do in other than medical fields. Towards the end of the paper Mr. Jollyman said, the recent plague epidemic is testimony to the value of bacteriological work; what might have happened had not the early cases been examined bacteriologically one cannot tell, but it is quite certain that the value of an early diagnosis has been incalculable. With regard to the non-

pathological side of the question, the remarks made about brewing, butter-making, sewage disposal, soil fertility, &c., will suffice to indicate the commercial value of scientific investigation into these branches. What is going to happen in the future as the result of the study of bacteriology it is impossible to foretell. On the medical side, men are endeavouring to find out more about the causes of human diseases, and to follow up these discoveries by the introduction of specific cures. Veterinary bacteriologists are doing the same work for animals.

In what may be called the bacteriology of the trades, there is no question that there is a great deal to be done; brewing, tobacco-curing, manufacture of organic chemicals—possibly glycerin—and soap manufacture may before long become bacterial work, and so on. In fact, the study of these, the smallest living things known, leads to results of the greatest commercial value.

The bacteriological and other aspects of miners' phthisis, by Dr. L. G. Irvine. The author mentioned the urgent matter of prevention of this disease, and, putting the question as to why the disease should be more prevalent on the Rand than in most other mining centres, he stated that this was due to three reasons. First, the rock was hard and the mines were dry; second, the number of rock-drills used was proportionately great; and third, the quantity of explosives used was also proportionately large.

Notes on some pathogenic bacteria as found in the Transvaal, and their variations from their European prototypes, by Mr. F. H. Joseph.

#### *Papers read before Section C.*

Survey practice in the Transvaal, by Mr. P. B. Osborn. The author traced the development of survey practice in the Transvaal from the time of the first crude subdivision of land by the Voortrekkers to the present systematised scientific methods.

Geodetic surveying, by Mr. W. H. Greathead. The author first defined geodetic surveying as the art of surveying extended to large tracts of the earth's surface, in which account must be taken of the curvature of the earth, and proceeded to describe the delicate apparatus and methods used in measuring base lines for the Natal and Cape Colony survey; also the apparatus for the Rhodesian survey.

The mine surveyor and his work on the Witwatersrand, by Mr. A. E. Payne. The present Government is preparing, said the author, to establish the mine surveyor as a professional man. The detailed knowledge of the great variety of subjects coming within the scope of his work is worthy of consideration. He should become the technical adviser of the mine and be encouraged to develop his work from the professional point of view of a mine surveyor.

Fire protection in the mines, by Mr. G. H. Thurston. The Rhodesian tick fever, by Dr. Theiler. Having first pointed out the necessity for preventing the disease by wide publication of the methods to be adopted and by legislation, the author proceeded to discuss the geographical distribution and history of the malady.

The bacterial purification of sewage, by Mr. F. S. Prentice. Some conditions respecting irrigation in the new colonies, by Mr. W. Reid Bell. The blizzard of June 9–12, 1902, by Mr. C. M. Stewart, secretary, Meteorological Committee of Cape Colony. Seldom has South Africa been visited by a snowstorm of such severity, duration, and so extensive as that which started approximately at 6 p.m. on the evening of June 9, 1902, and continued practically without intermission at many places until the morning of June 12. Judging from the barometric readings, this storm seems to have originated in an area of low pressure in the centre of the colony, while the pressure in the west and south was increasing rapidly.

#### *Papers read before Section D.*

The handling of young children, by Mr. P. A. Barnett. The author pointed out that by people who recognised no scientific basis for education there is a good deal of random criticism of the efforts made to use systematically the data provided by other sciences. We want more system—not less; though the science of education remains yet to be formulated.

A paper on special assessment was read by Mr. Stephen Court.

Drawing for young children, by Mr. E. B. Sargent. The author said it was well recognised at the present day that the old plan of beginning to teach drawing by making the children produce a series of straight lines tended to disgust young children with the subject for their whole school life. It was much easier to draw circles than straight lines, as appeared natural if the mechanism of the arm was considered. It was also better to begin with drawing rather than with writing, and to practise from the shoulder at first, then from the elbow, and finally from the wrist and fingers. This plan prevented the straining of the eyes at a time when short sight was likely to be produced very early. There was also a great deal to be said for beginning with the brush and colour rather than with the pencil or chalk. Mr. Sargent then proceeded to consider in detail the code of the Orange River Colony, which gave effect in drawing to these principles.

#### General Business.

At a council meeting of the association on April 4, Sir Charles Metcalfe, the president, alluded to the visit of the British Association to Johannesburg next year, and said he had been in frequent correspondence with members of the committee which had been appointed in England, including Sir Norman Lockyer and Prof. Dewar. Everything is now settled except the route, the fixing of which it has been considered better to postpone until nearer the date. There is also the question as to who should be president for the year, and though this has not been decided yet, there was no doubt there would be a very good president coming out for the meetings. The greatest man of science of the day, Lord Kelvin, who would be eighty-one years of age next year, was resolved to come. With regard to the status of members of the South African Association, they would naturally be entitled to attend all the meetings of the British Association. The proposal was that there should be three days' meetings at Cape Town and three days' meetings at Johannesburg, with shorter sessions at Durban, Kimberley, Bulawayo, and other places visited.

Sir Charles Metcalfe also referred to the arrangements to be made in connection with the visit of the British Association at the annual business meeting of the South African Association. Certain local papers will be read, and these will be chosen by the local committees of the places where meetings are held, so that those who come from distances may have the opportunity of hearing a good paper dealing with the chief object of interest in that particular centre.

#### THE NEW ZEALAND VEGETABLE CATERPILLAR.

FEW among the smaller natural productions of New Zealand have attracted more attention than the so-called vegetable caterpillar of New Zealand, of which we have just received a very fine specimen from Messrs. Arm-brecht, Nelson and Co., of Duke Street, Grosvenor Square, W. Fungoid parasites are sufficiently common in all parts of the world, but are not generally conspicuous enough to be much noticed by any persons but naturalists. Many of the largest and most remarkable moths of the Australian region belong to the families Cossidae and Hepialidae, represented in Europe by our goat moth and swifts, and the caterpillars of several species of these are known to be infested by various parasitic fungi belonging to the genus *Cordyceps*, Fries, which convert the whole substance of the caterpillar into a woody substance, and then sprout from it to a length of several inches.

As in the case of larvæ attacked by insect parasites, these (which are usually about four inches long when full grown) live until they are ready to assume the pupa state, when they bury themselves in the ground, die, and the fungus sprouts upwards, generally from the neck of the caterpillar, sometimes acquiring the length of nearly a foot, and sprouting up from the ground above the caterpillar. Very rarely two, or even three, of these filaments may sprout from a single caterpillar. The best known species is *Cordyceps Hugelii*, Corda (*Sphaeria Robertsii*, Hooker), which is extremely abundant in New Zealand.

"The New Zealander's name for this plant-caterpillar is

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Hotete, Aweto, Weru, and Anuhe. The natives eat the plants, which when fresh have the flavour of a nut, and also use them, when burnt, as colouring matter for their tattooing, rubbing the powder into the wounds, in which state it has a strong animal smell" (Gray, "Notices of Insects that are Known to Form the Bases of Fungoid Parasites" (1858), p. 6, note quoting from Taylor). Almost every writer in New Zealand has discussed the vegetable caterpillar in more or less detail, notably Taylor and Hochstetter, in addition to Gray's important paper quoted above. Mr. G. Massee's "Revision of the Genus *Cordyceps*" (*Annals of Botany*, vol. ix. pp. 1-44, pls. i. and ii., March, 1895) may also be consulted.

It is probable that more than one species of New Zealand caterpillar is infested by, perhaps, more than one species of *Cordyceps*. *C. Hugelii* (*Robertsii*) is usually said to be parasitic on the larva of the large green moth *Hepialus* (*Enegetus*) *virescens*, Doubleday, but Mr. G. V. Hudson points out in his "New Zealand Moths and Butterflies" (p. 132) that this cannot be the case, because the larva of that insect burrows in the wood of trees, and forms its pupa in the galleries, and not in the ground. He suggests that it may infest the larva of *Porina Mairi*, Buller, a brown moth with black and white spots and markings; but this seems equally improbable, for this is a very rare moth, of which very little seems to be known. More information on these curious parasites and their hosts is very desirable.

W. F. KIRBY.

#### UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

OXFORD.—A meeting of the University Junior Scientific Club was held on May 4. Mr. H. B. Hartley exhibited an unpublished portrait of Sir Richard Owen. Mr. A. S. MacNalty read a paper on William Harvey.

The eleventh Robert Boyle lecture will be delivered on June 3 in Balliol College Hall by Prof. J. J. Thomson, F.R.S. His subject will be "The Structure of the Atom."

The Romanes lecture will be delivered by Sir Courtenay Peregrine Ilbert, K.C.S.I., Balliol College, on Saturday, June 4, at 3 p.m., in the Sheldonian Theatre. The subject of his discourse will be "Montesquieu."

A meeting was held in the schools on Friday, May 6, to discuss the question of the organisation of post-graduate study. The president of Trinity was in the chair. The meeting was largely attended by those who are interested in the encouragement of research. Prof. Poulton moved a resolution advocating the expediency of "the further utilisation of fellowships for the purposes of research." This was seconded by Profs. Ellis and Gardner, and carried unanimously. Dr. Farnell moved a resolution favouring "the better organisation of the teaching resources of Oxford." He wished to see the boards of faculty take a more active part in organising the teaching resources, which now suffer from considerable dislocation. The boards ought to be able to give the status of professor to a college tutor, and assign him an income from university funds. The general principle of Dr. Farnell's resolution was carried.

CAMBRIDGE.—Sir Michael Foster has been re-appointed a manager of the Balfour (Animal Morphology) Fund.

Applications for leave to occupy the university tables at the Naples and Plymouth Zoological Stations are to be sent to Dr. Harmer, King's College, by May 26.

Mr. Frank G. Smart, M.B., has generously endowed a university studentship for research in botany of the value of 100l. a year for two years. The first election will be made in July.

The Board of Agricultural Studies reports the continued progress of the department, which last term had forty students. A number of field experiments have been instituted, and are in progress on the university farm and in the adjoining counties, under the supervision of Prof. Middleton and his staff.

THE Drapers' Company has decided to grant 15,500l. to the University College of South Wales for the purpose of erecting the structure of the proposed new library, in lieu of 10,000l. conditionally granted in 1895.